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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/669,220

09/24/2003

Yue Liu

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(13358.6USD1)

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22913 7590 03/31/2006

EXAMINER

MENEFEE, JAMES A

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SALT LAKE CITY, UT 84111

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/669,220

Applicant(s)

LIU ET AL.

Examiner

James A. Menefee

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-20, 22-24 and 26-29 is/are rejected.
- 7) ☒ Claim(s) 21 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Note the examiner of record has changed. See communication information below.

Response to Amendment

In response to the amendment filed 1/3/2006, claims 1-12 are cancelled, claims 13-14 are amended, and claims 24-29 are added. Claims 13-29 are pending.

Applicant's arguments filed 1/3/2006 are persuasive as against the prior rejections, and those rejections are withdrawn. New grounds of rejection are presented below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 13-18, 20, 22, 24, and 26-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Thornton et al. (US 6,937,637). See especially Fig. 1 and the discussion thereof unless otherwise noted.

Regarding claim 13, Thornton discloses as in Fig. 1 a method of producing a device comprising the steps of forming at least one optoelectronic structure 16, where formation comprises depositing an epitaxial layer on a substrate 12 (growth is epitaxial, see col. 9 lines 29-34), forming a through wafer via 52 extending from a top surface to a bottom surface of the

Art Unit: 2828

device, and forming an isolation moat 25 disposed about said through wafer via and said at least one optoelectronic device, said isolation moat extends through epitaxial layers 24. While not called an isolation moat, the region is ion implanted and may thus be considered isolating.

Regarding claim 14, the optoelectronic structure is a VCSEL.

Regarding claim 15, there are p-contacts 46, 60, one on each of the top and bottom surfaces. P-contacts are anodes.

Regarding claim 16, the anodes are connected through the through wafer via 52.

Regarding claims 17-18, via 52 includes a conductive metal.

Regarding claim 20, the through wafer via is formed by RIE. Col. 10 lines 24-25.

Regarding claim 22, region 38 may be an ion implantation region, col. 9 lines 46-47, and is located below the moat.

Regarding claim 24, there is oxidation trench 39 extending into the epitaxial layers.

Regarding claims 26-27, as shown in Fig. 12B, the stack may include laser 16 and detector 139.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thornton. Thornton discloses the limitations of the parent claims as noted above, but does not

Art Unit: 2828

disclose that the conductive metal is gold or that hydrogen is used as the ion implantation dopant. But the use of such materials as conductive layers and ion implantation dopants respectively is known in the art, and it would have been obvious to one skilled in the art to use these materials since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 277 F.2d 197, 125 USPQ 416 (CCPA 1960).

Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thornton in view of Nishiguchi et al. (US 6,154,476). Thornton discloses the limitations of the claims as shown above, but discloses connecting two anodes rather than two cathodes. However, if the p and n sides were reversed, that is if the device were p-type on the bottom and n-type on the top, then it would be the n-type layers, i.e. cathode, that were attached by the via. Nishiguchi teaches that it is known in the art in lasers to use p-type layers at the bottom rather than n-type layers. See col. 1 lines 24-32, 50-55, and the remainder of the invention as described by Nishiguchi. It would have been obvious to one skilled in the art to do so because of the higher speed characteristics of this configuration, as taught by Nishiguchi.

Allowable Subject Matter

Claims 21, 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. There is not taught or disclosed in the prior art a method of producing a device including an optoelectronic structure and a wafer through via as claimed,

Art Unit: 2828

where an etched isolation moat is disposed about the optoelectronic structure and the via.

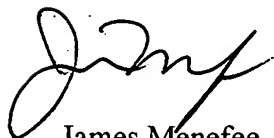
Thornton uses only an ion implanted moat as noted in the above rejections, and there is no suggestion of making the moat by etching.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James Menefee
March 27, 2006